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UNITED STATES DEPARTMENT OF AGRICULTURE
CIRCULAR No. 50

WASHINGTON, D. C.

Issued December 1928
Revised October 1931

PROXIMATE COMPOSITION OF FRESH FRUITS

By

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UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1937

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INTRODUCTION

Need for reliable information on the proximate composition of foods has increased since the last revision of Atwater and Bryant's bulletin.[1] Analyses made before 1900 still form the basis for almost all dietary calculations on the protein, fat, and carbohydrates of foods, and there has been a growing demand recently for new summary tables.

Proximate analyses of fruits since 1900 have supplemented to a considerable extent the data in Atwater and Bryant's compilation, providing figures on several fruits not included in their list, and confirming or modifying the earlier results. In the present study data on fresh fruits have been brought together from a large number of sources, published and unpublished, too many to enumerate. Most of the figures represented in the earlier summary have been included. Many of the unpublished data have been contributed by the laboratories of this department, particularly those in the Bureau of Plant Industry, the Bureau of Chemistry and Soils, and the Food and Drug Administration. Other material has been supplied by the various agricultural experiment stations and colleges and by individuals.

As the figures are intended to represent the composition of the fruits as they are eaten, data from analyses of normally ripened and market fruits have been combined. No analyses of fruits have been included unless the report stated or clearly implied that the fruit was mature or in good marketable condition. Fruit juices are the fresh pressed juices from sound fruits, and are unsweetened and undiluted.

Data were taken only from sources that were considered reliable, and the figures were examined for evidences of error in the results reported. Most of the later analyses that have been chosen were made according to the methods of the Association of Official Agricultural Chemists.[2] In many cases the records, however, were not definite about the analytical methods, and in others variations from the official procedure have been described. Such data have been included if the indications were that the results were comparable and of sufficient accuracy for the present purpose.

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[1] ATWATER, W. O., and BRYANT, A. P. THE CHEMICAL COMPOSITION OF AMERICAN FOOD MATERIALS. U. S. Dept. Agr., Off. Expt. Stas., Bul. 28, 87 p., illus. 1899. (Revised ed. Reprinted 1906.)

Fruits are grouped in various ways, for the most part according to species. The Bureau of Plant Industry has given much helpful advice in this classification. The data on some fruits were not sufficient to permit of distinction within the genus. In the case of others, the data lent themselves to varietal, type, or geographic classification. Such groupings were used if it appeared that the differences between groups were significant. In still other cases such classes as red and black raspberries were reported separately, although it was doubtful whether any significance should be attached to the differences.

DEFINITION OF TERMS

REFUSE AND EDIBLE PORTION

For each fruit the "refuse" is defined according to the part represented, so far as this could be determined from the records. The basis of selection of these figures was similar to that used by Atwater and Bryant.[3] An effort was made to exclude data that represented any considerable loss from spoilage in addition to the normal refuse, but many of the records were not definite on this point. Percentages of refuse are expressed in terms of the fruit "as purchased."

All of the data on chemical constituents refer to the "edible portion." The values in the line designated as A. P. refer only to the constituents of the edible part, but are calculated as percentages of the "as purchased" weight.

The part of the fruit that was analyzed and here reported as edible can be inferred usually by the definition of refuse, but there are certain discrepancies on this point. In apples, for example, the chemical sample of the edible portion was not peeled in all cases. It included skins in some studies; from other reports it is not clear whether the skins were included or excluded; and in three cases the entire apple was analyzed. Enough data were available, however, to indicate that in these cases the variations were of minor importance.

For some fruits such as crab apples and currants no data on refuse percentage were found, but this does not imply that the whole fruit was analyzed "as purchased." With a few unimportant exceptions no data have been included from samples in which parts that are usually discarded were analyzed.

In fruits with skins that are sometimes considered edible and sometimes discarded as refuse, removal of the skins from the chemical sample would be expected to have a noticeable effect on the fiber content and possibly on the content of ether extract and ash. But the variations in these constituents in individuals are so wide that the difference due to presence or absence of skin is relatively small.

The seeds of grapes were counted as refuse in some studies and as edible in others. Such a difference in basis would, presumably, have a marked effect particularly on the fiber content, but owing to a lack of sufficient original data, it was impossible to make a sharp distinction on this point in selecting analyses for the present summary.

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[2] ASSOCIATION OF OFFICIAL AGRICULTURAL CHEMISTS. OFFICIAL AND TENTATIVE METHODS OF ANALYSIS. COMPILED BY THE COMMITTEE ON EDITING METHODS OF ANALYSIS. REVISED TO JULY 1, 1924. Ed. 2, 535 p., illus. Washington, D. C. 1925.

[3] ATWATER, W. O., and BRYANT, A. P. Op. cit.

AVERAGES AND VARIATIONS

Averages are arithmetical means of individual values as given in percentage of the edible portion except in a few stated cases. In these few instances averages were taken on a water-free basis and calculated back to the fresh, at the average water content. Probable error, indicated as P. E., has been given to indicate variation in individual determinations and is the standard deviation × 0.6745. In cases where part of the source material was given only as averages, estimates have been made by allowing for variation within the group averaged.

WATER

Water content refers to the loss in weight from drying or the difference between the weight of the total solids and the fresh substance. In some cases the material was air dried at 100° C. and in others it was dried in vacuum at lower temperatures. Probably the errors due to method are greater in the determination of this constituent than in any of the others.

PROTEIN, FAT, AND ASH

Protein was calculated as $N \times 6.25$, the nitrogen being determined by the Kjeldahl method or one of its modifications. Fat was determined as ether extract, and it includes therefore other ether-soluble substances such as plant pigments. Ash is the residue from burning the dry substance until it is free from carbon. When determinations of fat content were lacking, a figure was sometimes assumed to admit of calculations of fuel value. In a single case, also, such an assumption was made for protein. All assumptions were made on the basis of analyses of similar substances and may be in error by several tenths of a per cent, but these errors would hardly be significant in dietary calculations.

TOTAL CARBOHYDRATES

The term "total by difference including fiber" under carbohydrates refers to solids other than protein, fat, and ash. Like nitrogen-free extract it includes organic acids and undetermined solids as well as the substances properly classed as carbohydrates. It is numerically equal to the sum of nitrogen-free extract and fiber. It is apparent that any errors in the determination of water, protein, fat, or ash will be reflected in this quantity and that it is therefore less reliable than a direct determination. No indication of the variation in this quantity is given since individual calculations of it were not recorded, but it can be assumed that the variation in this group of substances would be of about the same order as that of the water content.

FIBER

Fiber is the loss in weight from incinerating the residue obtained by successive treatments of the fat-free dry substance with dilute sulphuric acid and dilute sodium hydroxide.

SUGARS

The term "sugars as invert" refers to total sugars, and the quantity is given as in the other constituents, in percentage of the fresh edible substance. They were determined in the majority of cases on the water extract and calculated either as invert sugar or as dextrose. In a few cases, however, only the pressed juice was analyzed, and the data in such cases refer to sugar in this juice calculated as percentage of the original substance. Either copper reduction or polarimetric methods were used, the former predominating. It was impossible to convert all of these figures to a strictly uniform basis, particularly where the reports did not give definite descriptions; but only minor differences are due to this irregularity.

ACID

Acid is the total free acid as determined by titration against standard alkali. It is expressed as malic (M) or anhydrous citric (C) according to which was considered to predominate, and is calculated into percentage of the fresh substance.

FUEL VALUE

Fuel value is expressed in calories which were calculated on the basis of the physiological fuel values, or 4 calories per gram of protein and of total carbohydrates and 9 per gram of fat.

ACCURACY AND LIMITATIONS OF THE FIGURES

The figures here presented are the result of a careful and critical study of the source material. They are as reliable and accurate as they could be made with the data available. There are, however, certain necessary limitations imposed on any such attempt to give a composite picture of substances that vary as much among themselves as do the individual fruits in any one group. The figures should be used, therefore, with an understanding of their limitations.

On account of this variability in the make-up of fruits the averages of a class can be only rough estimates at best of the composition of a particular sample. Some of the averages represent samples from numerous types of the fruit and from various localities and growing conditions, and these probably are fairly reliable as average figures for their class. But in the case of some others it was impossible to get data that could be regarded as representative of the class as a whole.

Many of the data used in this study came from analyses that were incomplete in the sense that not all of the constituents that are in the table were determined. This will be evident from the differences in the number of analyses as shown in the last line under each fruit. Attention should be called in this connection to the fact that the determinations of a particular constituent, as sugars for example, may have come from an entirely different lot of material than that on which water content was determined. This accounts for some of the discrepancies.

In general, it would be expected if all of the analyses were complete that the sum of sugar, fiber, and acid would be less than the total carbohydrates and, since ripe fruits have little or no starch, would come within 1 to 3 per cent of it. But in some cases the total of these three substances is greater, and in others it does not come within 3 per cent of it. Such differences may be due either to the errors of sampling or to inaccuracy in analytical technic. Possibly, however, there may be in some fruits undetermined substances in excess of 3 per cent.

Composition of fresh fruits

		As purchased	Edible portion									
		Refuse	Water	Protein (N× 6.25)	Fat	Ash	Carbohydrates			Acid as malic (M), as citric (C)	Fuel value	
							Total by difference, including fiber[1]	Fiber	Sugars as invert		Per 100 grams	Per pound
		P. ct. *Skins and cores*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
Apples (Malus sylvestris): All varieties	Av	12	84.1	0.3	0.4	0.29	14.9	[2]1.0	11.1	0.47 M	64.4	290
	P. E.	2.0	1.6	.1	.2	.05	------	.2	.9	.11	------	------
	Max.	25	90.9	.8	1.0	.6	------	1.8	15.9	1.15	------	------
	Min.	6	78.7	.1	.1	.1	------	.4	6.6	.10	------	------
	A. P.	------	74.0	.3	.4	.3	13.0	.9	9.8	.4	57	260
	No.	*289*	*230*	*383*	*37*	*123*	------	*21*	*499*	*486*	------	------
Early varieties (summer).	Av	------	86.5	.3	[3].4	.30	12.5	------	9.4	.70 M	54.8	250
	P. E.	------	1.1	.1	------	.04	------	------	.6	.22	------	------
	Max.	------	89.7	.6	------	.4	------	------	10.6	1.15	------	------
	Min.	------	84.4	.2	------	.2	------	------	7.6	.10	------	------
	No.	------	*8*	*11*	*0*	*6*	------	------	*12*	*12*	------	------
Medium varieties (fall).	Av	------	85.4	.3	.3	.25	13.8	1.1	10.4	.45 M	59.1	270
	P. E.	------	1.4	.1	------	.06	------	------	.7	.08	------	------
	Max.	------	88.8	.7	------	.4	------	------	12.5	.71	------	------
	Min.	------	82.5	.1	------	.2	------	------	8.6	.12	------	------
	No.	------	*8*	*26*	*1*	*8*	------	*1*	*27*	*26*	------	------
Late varieties (winter).	Av	------	83.6	.3	.3	.28	15.5	.9	11.2	.46 M	65.9	300
	P. E.	------	1.3	.1	.1	.05	------	.1	.9	.10	------	------
	Max.	------	90.4	.8	.6	.4	------	1.2	15.9	1.14	------	------
	Min.	------	78.7	.1	.1	.2	------	.7	6.6	.13	------	------
	No.	------	*184*	*316*	*11*	*80*	------	*10*	*455*	*443*	------	------
Apple juice, all varieties of apples.	Av	------	87.1	.1	[3]0.0	.25	12.5	------	10.5	.52 M	50.4	230
	P. E.	------	1.4	.03	------	.04	------	------	1.2	.13	------	------
	Max.	------	92.5	.2	------	.4	------	------	15.4	1.2	------	------
	Min.	------	81.2	.0	------	.17	------	------	6.5	.07	------	------
	No.	------	*154*	*32*	*0*	*64*	------	------	*159*	*167*	------	------
Apricots (Prunus armeniaca).	Av	*Pits* 6	85.4	1.0	[4].1	.59	12.9	[5].6	10.4	1.19 M	56.5	255
	P. E.	0.4	1.3	.2	.04	.10	------	.2	1.4	.24	------	------
	Max.	7	91.5	1.4	.2	.90	------	1.0	13.8	1.83	------	------
	Min.	5	81.9	.4	.0	.3	------	.4	5.2	.69	------	------
	A. P.	------	80.3	.9	.1	.6	12.1	.6	9.8	1.1	53	240
	No.	*12*	*21*	*14*	*7*	*24*	------	*4*	*21*	*9*	------	------
Avocados (Persea spp.): Fuerte, hybrid race.	Av	*Seeds and skins* 25	65.4	1.7	26.4	1.42	5.1	1.8	.6	----------	264.8	1,200
	P. E.	2.3	1.5	.2	1.3	.11	------	------	.1	----------	------	------
	Max.	30	68.4	2.3	29.1	1.7	------	2.1	.8	----------	------	------
	Min.	18	60.9	1.3	23.8	1.2	------	1.5	.3	----------	------	------
	A. P.	------	49.0	1.3	19.8	1.1	3.8	1.4	.4	----------	199	905
	No.	*11*	*10*	*9*	*10*	*9*	------	*3*	*4*	----------	------	------

[1] See explanation in text.
[2] Skin included in edible portion in some analyses.
[3] Assumed.
[4] Calculated in part from dried fruit.
[5] Calculated from dried fruit.

Composition of fresh fruits—Continued

		As purchased	Edible portion									
							Carbohydrates				Fuel value	
		Refuse	Water	Protein (N× 6.25)	Fat	Ash	Total by difference, including fiber	Fiber	Sugars as invert	Acid as malic (M), as citric (C)	Per 100 grams	Per pound
		P. ct. *Seeds and skins*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
Avocados (Persea spp.)—Con. Guatemalan race (P. americana).	Av.	30	74.1	2.0	17.2	1.28	5.4	1.4	0.7		184.4	835
	P. E.	4.6	3.0	.5	2.8	.19		.1	.2			
	Max.	48	84.3	4.4	28.8	1.93		1.9	1.6			
	Min.	16	60.5	.8	7.1	.54		1.0	.3			
	A. P.		51.9	1.4	12.0	.9	3.8	1.0	.5		129	585
	No.	*131*	*129*	*112*	*128*	*80*		*16*	*23*			
Mexican race (P. americana drymifolia).	Av.	31	66.7	2.0	23.2	1.38	6.7				243.6	1,105
	P. E.	4.7	3.5	.4	2.9	.18						
	Max.	44	77.1	3.5	32.7	1.94						
	Min.	14	55.0	1.1	14.6	.66						
	A. P.		46.0	1.4	16.0	1.0	4.6				168	760
	No.	*32*	*32*	*31*	*32*	*30*						
West Indian race (P. americana).	Av.	24	82.2	1.3	7.7	.98	7.8	1.2			105.7	480
	P. E.		1.2	.3	.9	.10		.1				
	Max.	28	85.4	2.6	10.7	1.16		1.6				
	Min.	19	78.7	1.0	5.7	.60		.9				
	A. P.		62.5	1.0	5.9	.7	5.9	.9			81	365
	No.	*2*	*15*	*15*	*15*	*14*		*12*				
		Skins										
Bananas (Musa sapientum).	Av.	33	74.8	1.2	.2	.84	23.0	.6	19.2	0.39 M	98.6	445
	P. E.	2.6	2.4	.2	.2	.11		.3	1.7	.08		
	Max.	40	83.4	2.0	1.4	1.4		1.8	25.7	.55		
	Min.	23	65.4	.8	.0	.5		.2	14.5	.26		
	A. P.		50.1	.8	.1	.6	15.4	.4	12.9	.3	66	300
	No.	*34*	*69*	*59*	*39*	*62*		*18*	*36*	*21*		
Blackberries[6] (Rubus spp.).	Av.		85.3	1.2	1.1	.47	11.9	4.1	6.1	[7] .91 C	62.3	285
	P. E.		1.4	.2	.5	.08		.8	1.8	.21		
	Max.		89.4	1.7	2.9	.9		5.8	10.3	2.00		
	Min.		78.4	.8	.5	.28		2.5	4.0	.45		
	No.		*43*	*33*	*9*	*43*		*4*	*44*	*44*		
Blackberry juice.	Av.		92.3	.3	[1] 0.0	.39	7.0		5.4	[7] .92 C	29.2	130
	P. E.		.5	.1		.05				.13		
	Max.		93.0	.6		.52			7.5	1.18		
	Min.		90.9	.1		.3			4.2	.70		
	No.		*6*	*6*	*0*	*6*			*3*	*5*		
Blueberries[8] (Vaccinium spp.).	Av.		83.4	.6	.6	.28	15.1	1.2	9.7	.67 C	68.2	310
	P. E.		1.2	.1		.05						
	Max.		86.5	.7		.4			11.9	1.14		
	Min.		82.0	.5		.19			7.9	.19		
	No.		*4*	*4*	*1*	*4*		*1*	*3*	*2*		
Blueberry juice.[9]	Av.		85.9	.1	[1] 0.0	.19	13.8		12.4	.19 C	55.6	250
	P. E.											
	Max.			.1								
	Min.			.1								
	No.		*1*	*2*	*0*	*1*			*1*	*1*		

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[1] Assumed.
[6] Including dewberries. (See also Logan blackberries.)
[7] Principally in the form of isocitric.
[8] Including whortleberries. Data on buckleberries, *Gaylussacia spp.*, are also included.
[9] Including whortleberry juice.

Composition of fresh fruits—Continued

		As purchased	Edible portion									
							Carbohydrates				Fuel value	
		Refuse	Water	Protein (N×6.25)	Fat	Ash	Total by difference, including fiber	Fiber	Sugars as invert	Acid as malic (M), as citric (C)	Per 100 grams	Per pound
Cherries (Prunus spp.):		*P. ct.* *Pits*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
Sour, sweet, and hybrid.[10]	Av.	6	83.0	1.1	0.5	0.55	14.8	0.3			68.1	310
	A. P.		78.0	1.0	.5	.5	14.0	.3			64	290
	No.	*22*		*25*	*3*	*57*		*4*				
Sour (P. cerasus).	Av.	5	84.4	1.3	[3] .5	.51	13.3		9.5	1.38 M	62.9	285
	P. E.	.5	1.7	.3		.05			1.0	.22		
	Max.	6	90.0	2.0		.70			12.5	2.39		
	Min.	4	78.7	.8		.36			7.3	.38		
	A. P.		80.2	1.2	[3] .5	.5	12.6		9.0	1.3	60	270
	No.	*5*	*31*	*6*	*0*	*37*			*26*	*35*		
Sweet (P. avium).	Av.	6	80.0	1.1	[3] .5	.6	17.8	.4	11.6	.68 M	80.1	365
	P. E.	1.1	1.7	.2		.1			1.2	.24		
	Max.	10	83.9	1.7		1.0			13.8	1.12		
	Min.	3	74.7	.7		.4			7.7	.22		
	A. P.		75.2	1.0	[3] .5	.6	16.7	.4	10.9	.6	75	340
	No.	*15*	*17*	*14*	*0*	*14*		*1*	*15*	*6*		
Crab apples (Malus spp.).	Av.		81.1	.4	[3] .3	.42	17.8	.6	12.6	.93 M	75.5	340
	P. E.		1.5			.05			1.2	.18		
	Max.		84.0	.4		.56			15.7	1.28		
	Min.		78.0	.4		.33			11.0	.44		
	No.		*5*	*2*	*0*	*5*		*1*	*5*	*5*		
Crab apple juice.	Av.		85.0						11.2	.77 M		
	P. E.		1.5						1.2	.24		
	Max.		89.1						14.6	1.81		
	Min.		81.4						7.9	.4		
	No.		*11*						*11*	*15*		
Cranberries (Oxycoccos macrocarpus).	Av.		87.4	.4	.7	.20	11.3	1.4	4.2	2.36 C	53.1	240
	P. E.		1.5	.04	.1	.02		.1	.5	.13		
	Max.		89.5	.5	1.0	.22		1.7	5.6	2.67		
	Min.		81.7	.3	.4	.14		1.2	2.4	1.91		
	No.		*18*	*6*	*6*	*10*		*5*	*11*	*16*		
Currants (Ribes spp.), red, white, and black.	Av.		84.7	1.6	.4	.61	12.7	3.2	5.7	2.30 C	60.8	275
	P. E.		1.6	.5		.05		1.3	1.0	.35		
	Max.		90.3	3.4	.6	.8		5.1	8.9	3.64		
	Min.		79.3	.3	.2	.4		.4	3.4	1.74		
	No.		*22*	*11*	*2*	*24*		*4*	*22*	*23*		
Currants, red, juice.	Av.		89.1	.3	[3] 0.0	.54	10.1		6.2	2.00 C	41.6	190
	P. E.		1.5			.06			.7	.40		
	Max.		93.3	.3		.68			8.3	3.37		
	Min.		87.4	.3		.42			4.8	1.08		
	No.		*6*	*2*	*0*	*8*			*7*	*14*		
Currants, black, juice.	Av.			.5		.68			10.9	2.87 C		
	P. E.											
	Max.									3.22		
	Min.									2.52		
	No.			*1*		*1*			*1*	*2*		

[3] Assumed.

[10] Calculated at 83 per cent water from averages on dry basis.

Composition of fresh fruits—Continued

		As purchased	Edible portion									
							Carbohydrates				Fuel value	
		Refuse	Water	Protein (N× 6.25)	Fat	Ash	Total by difference, including fiber	Fiber	Sugars as invert	Acid as malic (M), as citric (C)	Per 100 grams	Per pound
		P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
Figs[11] (Ficus carica).	Av	------	[11] 78.0	1.4	0.4	0.64	19.6	1.7	[12] 16.2	[12] 0.17 C	87.6	395
	P. E.	------	4.3	.2	.1	.22	------	.3	2.1	.05	------	------
	Max.	------	88.0	2.4	1.1	1.05	------	2.7	20.5	.38	------	------
	Min.	------	50.0	.8	.1	.26	------	1.0	3.5	.02	------	------
	No.	------	*53*	*59*	*28*	*68*	------	*25*	*68*	*44*	------	------
Gooseberries (Ribes spp.), ripe and underripe.	Av	------	88.3	.8	.4	.39	10.1	2.5	4.2	[13] 2.32 C	47.2	215
	P. E.	------	1.3	.1	------	.06	------	------	1.0	.23	------	------
	Max.	------	92.0	1.0	.7	.48	------	------	7.2	2.77	------	------
	Min.	------	85.6	.3	.1	.2	------	------	2.0	1.54	------	------
	No.	------	*11*	*9*	*3*	*11*	------	*1*	*12*	*10*	------	------
Grapefruit (Citrus grandis):		*Rinds and seeds*										
All	Av	34	88.8	.5	.2	.42	10.1	.3	6.5	------	44.2	200
	P. E.	4.1	1.2	.1	.04	.05	------	------	.6	------	------	------
	Max.	54	93.1	.6	.2	.54	------	.3	8.5	------	------	------
	Min.	25	86.0	.3	.1	.30	------	.2	4.6	------	------	------
	A. P.	------	58.6	.3	.1	.3	6.7	.2	4.3	------	29	130
	No.	*31*	*61*	*10*	*15*	*8*	------	*2*	*47*	------	------	------
Florida-grown fruit.	Av	[14] 31	90.1	.5	[8] .2	.54	8.7	------	6.5	1.16 C	38.6	175
	P. E.	1.9	.6	.1	------	------	------	------	.6	.10	------	------
	Max.	35	90.8	.6	------	------	------	------	8.4	1.58	------	------
	Min.	25	86.1	.3	------	------	------	------	5.0	.90	------	------
	A. P.	------	62.2	.3	[8] .1	.4	6.0	------	4.5	.8	26	120
	No.	*6*	*24*	*6*	*0*	*1*	------	------	*32*	*38*	------	------
California-grown fruit.	Av	[15] 34	87.7	.5	.2	.4	11.2	.3	6.6	2.23 C	48.6	220
	P. E.	3.4	.8	------	.05	------	------	------	.4	.12	------	------
	Max.	42	90.6	------	.2	------	------	------	7.8	2.63	------	------
	Min.	28	86.0	------	.1	------	------	------	5.4	2.04	------	------
	A. P.	------	57.9	.3	.1	.3	7.4	.2	4.4	1.5	32	145
	No.	*21*	*30*	*1*	*14*	*1*	------	*1*	*9*	*9*	------	------
Grapefruit juice: Florida-grown fruit.	Av	------	90.1	------	------	.4	------	------	6.65	1.42 C	------	------
	P. E.	------	.8	------	------	------	------	------	.63	.18	------	------
	Max.	------	92.4	------	------	------	------	------	9.66	2.43	------	------
	Min.	------	87.1	------	------	------	------	------	4.54	.7	------	------
	No.	------	*676*	------	------	*1*	------	------	*764*	*767*	------	------
California-grown fruit.	Av	------	89.3	.4	.1	.4	9.8	------	7.03	1.77 C	41.7	190
	P. E.	------	.7	------	------	------	------	------	.65	.23	------	------
	Max.	------	92.5	------	------	------	------	------	9.51	2.64	------	------
	Min.	------	86.1	------	------	------	------	------	3.38	.85	------	------
	No.	------	*351*	*1*	*1*	*1*	------	------	*350*	*355*	------	------

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[8] Assumed.

[11] Water content of fresh figs varied widely, averaging 78.4 per cent. Because of this wide variation all nutrients in fresh and dried figs were calculated to 78 per cent water content.

[12] Approximate values. Only the pressed juice was analyzed for sugar and acid in most cases, and calculations were based on these results.

[13] Not known whether citric or malic acid predominates. Both are present.

[14] Rinds, 13 samples, av. 24.8 per cent; max. 31.8 per cent; min. 18.2 per cent. Seeds, 6 samples, av. 3.4 per cent; max. 4.4 per cent; min. 3.0 per cent.

[15] Rinds, 17 samples, av. 32.4 per cent; seeds, 14 samples, av. 1.7 per cent.

Composition of fresh fruits—Continued

		As purchased	Edible portion									
							Carbohydrates				Fuel value	
		Refuse	Water	Protein (N× 6.25)	Fat	Ash	Total by difference, including fiber	Fiber	Sugars as invert	Acid as malic (M), as citric (C)	Per 100 grams	Per pound
Grapefruit juice—Contd.		*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
Arizona-grown fruit.	Av.	------	89.9	------	------	------	------	------	6.69	1.61 C	------	------
	P. E.	------	.5	------	------	------	------	------	.42	.12	------	------
	Max.	------	91.6	------	------	------	------	------	8.02	1.92	------	------
	Min.	------	88.5	------	------	------	------	------	5.27	1.24	------	------
	No.	------	*31*	------	------	------	------	------	*31*	*30*	------	------
Grapes (Vitis spp.):		*Skins and seeds*										
American types.	Av.	[17] 22	81.9	1.4	1.4	0.45	14.9	[18] 0.5	11.5	1.21 M	77.8	355
	P. E.	1.8	1.9	.3	------	.07	------	------	1.2	.16	------	------
	Max.	25	85.9	2.2	1.7	.6	------	.5	14.4	1.67	------	------
	Min.	17	72.0	.7	1.1	.3	------	.5	7.0	.86	------	------
	A. P.	------	63.9	1.1	1.1	.4	11.5	.4	9.0	.9	60	270
	No.	*8*	*28*	*10*	*2*	*10*	------	*2*	*32*	*14*	------	------
		Seeds and stems										
European types (V. vinifera).	Av.	[19] 3	81.6	.8	.4	.46	16.7	[21] .5	14.9	.47 M	73.6	335
	P. E.[20]	------	2.4	.3	.1	.07	------	.1	1.9	.04	------	------
	Max.[20]	------	87.1	1.4	.6	.66	------	.6	19.9	.62	------	------
	Min.[20]	------	74.8	.3	.2	.20	------	.4	11.8	.40	------	------
	A. P.	------	79.2	.8	.4	.4	16.2	.5	14.5	.46	72	325
	No.	------	*38*	*28*	*4*	*27*	------	*4*	*26*	*23*	------	------
Grape juice: American types—All	Av.	------	80.7	.4	[8] 0.0	.39	18.5	------	16.84	.80 M	75.6	345
	P. E.	------	[22] 2.2	.03	------	.08	------	------	[23] 2.17	[24] .33	------	------
	Max.	------	------	.4	------	.64	------	------	------	------	------	------
	Min.	------	------	.3	------	.25	------	------	------	------	------	------
	No.	------	*983*	*4*	*0*	*30*	------	------	*1,543*	*1,543*	------	------

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[8] Assumed.

[17] No data on percentage of stems. Skins, 8 samples, av. 16.3 per cent; max. 19.2 per cent; min. 12.0 per cent; P. E. 1.7 per cent. Seeds, 8 samples, av. 5.9 per cent; max. 10.0 per cent; min. 4.3 per cent; P. E. 1.2 per cent.

[18] Four analyses, including seeds and skins, av. 5.2 per cent fiber.

[19] Skins considered in edible portion. Stems, 10 samples (Sultana grapes), av. 1.4 per cent; max. 1.5 per cent; min. 1.0 per cent. Seeds, 13 samples, av. 1.7 per cent; max. 4.0 per cent; min. 1.0 per cent; P. E. 0.5 per cent.

[20] Approximate values in the cases of water, protein, ash, sugar, and acid. Eight to eighteen determinations for these constituents were reported only as averages.

[21] One sample, Malaga grapes, analyzed with seeds contained 2.8 per cent fiber.

[22] Approximate value, only 171 analyses reported individually; av. of these, 80.8 per cent; max. 87.3 per cent; min. 73.9 per cent; P. E. 1.8 per cent.

[23] Approximate value, only 312 analyses reported individually; av. of these, 16.39 per cent; max. 25.25 per cent; min. 10.5 per cent; P. E. 1.75 per cent.

[24] Approximate value, only 312 anlyses reported individually; av. of these, 0.83 per cent; max. 1.88 per cent; min. 0.37 per cent; P. E. 0.31 per cent.

Composition of fresh fruits—Continued

		As purchased	Edible portion									
							Carbohydrates				Fuel value	
		Refuse	Water	Protein (N× 6.25)	Fat	Ash	Total by difference, including fiber	Fiber	Sugars as invert	Acid as malic (M), as citric (C)	Per 100 grams	Per pound
Grape juice—Continued. American types—Con.		*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
Catawba	Av.	------	79.1	0.4	[3] 0.0	0.30	20.2	------	17.9	0.89 M	82.4	375
	P. E.	------	[26] 1.0	------	------	.02	------	------	[27] 1.2	[28] .11	------	------
	Max.	------	------	------	------	.34	------	------	------	------	------	------
	Min.	------	------	------	------	.25	------	------	------	------	------	------
	No.	------	*272*	*1*	*0*	*6*	------	------	*443*	*443*	------	------
Concord	Av.	------	82.1	.3	[3] 0.0	.33	17.3	------	15.7	.63 M	70.4	320
	P. E.	------	[29] 1.0	------	------	.02	------	------	[30] 1.1	[31] .13	------	------
	Max.	------	------	.4	------	.38	------	------	------	------	------	------
	Min.	------	------	.3	------	.3	------	------	------	------	------	------
	No.	------	*287*	*3*	*0*	*3*	------	------	*384*	*384*	------	------
Delaware	Av.	------	77.3	[3] .3	[3] 0.0	.32	22.1	------	19.9	.65 M	89.6	405
	P. E.	------	[32] 1.4	------	------	.05	------	------	[33] 1.9	[34] .09	------	------
	Max.	------	------	------	------	.44	------	------	------	------	------	------
	Min.	------	------	------	------	.25	------	------	------	------	------	------
	No.	------	*69*	*0*	*0*	*4*	------	------	*132*	*132*	------	------
Muscadine	Av.	------	86.7	.1	[3] 0.0	.2	13.0	------	12.5	.69 M	52.4	240
	P. E.	------	[35] 1.1	------	------	------	------	------	------	[36] .13	------	------
	Max.	------	------	.1	------	.2	------	------	------	------	------	------
	Min.	------	------	.1	------	.2	------	------	------	------	------	------
	No.	------	*28*	*3*	*0*	*3*	------	------	[37] *13*	*28*	------	------
European types (V. vinifera)—All	Av.	------	77.1	.4	------	------	------	------	19.8	.61 M	------	------
	P. E.	------	2.2	.1	------	------	------	------	2.4	.12	------	------
	Max.	------	83.3	.8	------	------	------	------	29.7	1.02	------	------
	Min.	------	70.5	.1	------	------	------	------	14.9	.28	------	------
	No.	------	*42*	*54*	------	------	------	------	*57*	*57*	------	------
Table and juice grapes.	Av.	------	78.3	.4	------	------	------	------	18.3	.63 M	------	------
	P. E.	------	1.7	.1	------	------	------	------	1.5	.09	------	------
	Max.	------	83.3	.8	------	------	------	------	23.4	.88	------	------
	Min.	------	71.4	.1	------	------	------	------	14.9	.29	------	------
	No.	------	*31*	*43*	------	------	------	------	*44*	*44*	------	------

[3] Assumed.

[26] Approximate value, only 9 analyses reported individually; av. of these, 79.8 per cent; max. 81.5 per cent; min. 78.4 per cent; P. E. 0.5 per cent.

[27] Approximate value, only 12 analyses reported individually; av. of these, 17.7 per cent; max. 20.7 per cent; min. 15.0 per cent; P. E. 0.9 per cent.

[28] Approximate value, only 12 analyses reported individually; av. of these, 0.84 per cent; max. 1.10 p cent; min. 0.65 per cent; P. E. 0.08 per cent.

[29] Approximate value, only 10 analyses reported individually; av. of these, 81.9 per cent; max. 84.1 p cent; min. 79.6 per cent; P. E. 0.9 per cent.

[30] Approximate value, only 31 analyses reported individually; av. of these, 14.9 per cent; max. 18.3 cent; min. 12.9 per cent; P. E. 1.0 per cent.

[31] Approximate value, only 31 analyses reported individually; av. of these, 0.80 per cent; max. 1.22 p cent; min. 0.45 per cent; P. E. 0.12 per cent.

[32] Approximate value, only 8 analyses reported individually; av. of these, 75.3 per cent; max. 78.8 per cent; min. 73.9 per cent; P. E. 1.0 per cent.

[33] Approximate value, only 10 analyses reported individually; av. of these, 21.3 per cent; max. 25.2 per cent; min. 17.2 per cent; P. E. 1.8 per cent.

[34] Approximate value, only 10 analyses reported individually; av. of these, 0.59 per cent; max. 0.75 per cent; min. 0.49 per cent; P. E. 0.07 per cent.

[35] Approximate value, only 4 analyses reported individually; av. of these, 85.5 per cent; max. 86.8 per cent; min. 83.4 per cent; P. E. 0.9 per cent.

[36] Approximate value, only 4 analyses reported individually; av. of these, 0.57 per cent; max. 0.72 per cent; min. 0.39 per cent; P. E. 0.08 per cent.

[37] Only 3 analyses reported individually; av. of these, 13.5 per cent; max. 14.9 per cent; min. 12.1 per cent

Composition of fresh fruits—Continued

		As purchased:	Edible portion									
							Carbohydrates				Fuel value	
		Refuse	Water	Protein (N×6.25)	Fat	Ash	Total by difference, including fiber	Fiber	Sugars as invert	Acid as malic (M), as citric (C)	Per 100 grams	Per pound
Grape juice—Continued. European types (V. vinifera)—Con. Raisin grapes.		*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
	Av		73.6	0.5					24.6	0.55 M		
	P. E.		1.6	.1					1.9	.11		
	Max		76.8	.6					29.7	1.02		
	Min		70.5	.3					21.1	.28		
	No.		*11*	*11*					*13*	*13*		
Guavas: Common (Psidium guajava).		*Skins and seeds*										
	Av	[38] 18	80.6	1.0	0.6	0.70	17.1	[39] 5.5	6.1	.62 C	77.8	355
	P. E.	1.4	1.8	.2	.2	.08		1.1	1.4	.12		
	Max	20	84.6	1.5	1.0	1.00		8.5	10.0	.88		
	Min	15	75.8	.3	.4	.46		3.4	3.0	.34		
	A. P.		66.1	.8	.5	.6	14.0	4.5	5.0	.5	64	290
	No.	*4*	*17*	*13*	*8*	*17*		*9*	*12*	*10*		
Strawberry (P. cattleianum).		*Skins*										
	Av	[40] 14	79.3	1.2	.6	.73	18.2	[41] 6.5	6.7	1.1 C	83.0	375
	P. E.		1.3		.1	.04		1.3				
	Max		81.7	1.8	.8	.77		9.4	10.0	1.5		
	Min		76.3	.9	.4	.64		3.9	4.5	.9		
	A. P.		68.2	1.0	.5	.6	15.7	5.6	5.8	.9	71	320
	No.	*1*	*4*	*3*	*4*	*4*		*4*	*3*	*3*		
Haws, scarlet (Crataegus spp.).		*Core*										
	Av	20	75.8	2.0	.6	.8	20.8	2.1			96.6	440
	A. P.		60.6	1.6	.5	.6	16.7	1.7			78	355
	No.	*1*	*1*	*1*	*1*	*1*		*1*				
Huckleberries. (See Blueberries.)												
Lemons (Citrus limonia).		*Rinds and seeds*										
	Av	[42] 38	89.3	.9	.6	.54	8.7	.9	2.2	5.07 C	43.8	200
	P. E.		.6	.1	.4	.05						
	Max		90.5	1.1	1.5	.71		1.3				
	Min		88.1	.6	.1	.5		.5				
	A. P.		55.4	.6	.4	.3	5.3	.6	1.4	3.1	27	120
	No.		*6*	*5*	*5*	*6*		*3*	*1*	*1*		
Lemon juice	Av		89.4			.33			2.3	5.96 C		
	P. E.		.9						.3	.54		
	Max		92.2			.35			3.6	8.33		
	Min		87.0			.31			1.1	4.20		
	No.		*12*			*2*			*80*	*376*		
Limes (Citrus aurantifolia).		*Rinds and seeds*										
	Av	24	86.0	.8	[3] .1	.8	12.3		.5	5.9 C	53.3	240
	Max	31	87.6	.9		1.0			.6	7.2		
	Min	19	85.2	.8		.7			.3	4.2		
	A. P.		65.4	.6	[3] .1	.6	9.3		.4	4.5	40	180
	No.	*3*	*3*	*2*	*0*	*3*			*3*	*3*		

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[3] Assumed.

[38] Skins, 5 samples, av. 13.4 per cent.

[39] Seeds were analyzed with pulp in most cases.

[40] No data on percentage of seeds; skins are thin and may be included in the edible portion. Two samples in which skins and seeds were both analyzed with the edible portion were reported as 2.0 per cent and 1.4 per cent refuse.

[41] Seeds, and in some cases skins, were analyzed with the pulp.

[42] Rinds, 115 samples, av. 37.3 per cent; max. 49.8 per cent; min. 17.2 per cent; P. E. 3.9 per cent. Seeds, 11 samples, av. 0.4 per cent; max. 1.7 per cent; min. 0.02 per cent; P. E. 0.35 per cent.

Composition of fresh fruits—Continued

		As purchased	Edible portion									
							Carbohydrates				Fuel value	
		Refuse	Water	Protein (N× 6.25)	Fat	Ash	Total by difference, including fiber	Fiber	Sugars as invert	Acid as malic (M), as citric (C)	Per 100 grams	Per pound
		P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
Lime juice	Av	------	91.3	0.5	[3] 0.0	0.4	7.8	------	0.3	7.7 C	33.2	150
	Max	------	91.7	.6	------	.4	------	------	.5	7.8	------	------
	Min	------	90.9	.4	------	.4	------	------	.0	7.4	------	------
	No	------	*3*	*3*	*0*	*3*	------	------	*3*	*3*	------	------
		Rinds and seeds										
Limes, Sweet (Citrus limetta).	Av	23	89.6	.8	.1	.6	8.9	0.8	6.0	.16 C	39.7	180
	P. E.	------	.5	------	------	.2	------	------	.6	.04	------	------
	Max	29	90.7	.9	------	1.0	------	------	7.2	.26	------	------
	Min	20	88.8	.6	------	.4	------	------	5.1	.13	------	------
	A. P.	------	69.0	.6	.1	.5	6.8	.2	4.6	.1	30	135
	No	*3*	*4*	*2*	*1*	*4*	------	*1*	*4*	*4*	------	------
Logan blackberries (Rubus sp.).	Av	------	82.9	1.0	[3] .6	.52	15.0	1.4	6.0	2.18 C	69.4	315
	P. E.	------	1.4	.2	------	.05	------	------	.6	.30	------	------
	Max	------	85.7	1.4	------	.64	------	------	8.0	2.89	------	------
	Min	------	79.8	.6	------	.4	------	------	5.0	1.49	------	------
	No	------	*9*	*5*	*0*	*9*	------	*1*	*11*	*11*	------	------
Logan blackberry juice.	Av	------	88.9	.6	[3] 0.0	.40	10.1	------	6.5	1.89 C	42.8	195
	P. E.	------	.7	------	------	.05	------	------	.8	.19	------	------
	Max	------	91.1	.9	------	.63	------	------	9.1	2.45	------	------
	Min	------	85.3	.4	------	.24	------	------	4.5	1.06	------	------
	No	------	*36*	*3*	*0*	*36*	------	------	*38*	*38*	------	------
		Skins and seeds										
Mangos (Mangifera indica).	Av	[45] 34	81.4	.7	.2	.48	17.2	1.0	13.7	.50 C	73.4	335
	P. E.	6.5	2.2	.3	.1	.15	------	.5	1.9	.25	------	------
	Max	52	89.8	2.1	.5	1.50	------	2.7	20.0	1.38	------	------
	Min	10	74.3	.2	.0	.20	------	.3	8.1	.12	------	------
	A. P.	------	53.7	.5	.1	.3	11.4	.7	9.0	.3	48	220
	No	*32*	*38*	*27*	*18*	*35*	------	*18*	*32*	*26*	------	------
Mulberries (Morus spp.), black, white, and red.	Av	------	82.8	1.2	[3] .6	.84	14.6	2.0	9.4	[46] .95 M	68.6	310
	P. E.	------	.9	.3	------	.06	------	.5	2.1	.30	------	------
	Max	------	84.7	1.6	------	.94	------	3.5	14.1	1.86	------	------
	Min	------	80.8	.4	------	.66	------	1.1	4.6	.41	------	------
	No	------	*6*	*6*	*0*	*6*	------	*5*	*6*	*6*	------	------
Muskmelons (Cucumis melo), all varieties.[47]	Av	------	92.8	.6	.2	.57	5.8	.7	5.4	------	27.4	125
	P. E.	------	1.7	.2	.1	.09	------	.2	1.4	------	------	------
	Max	------	96.5	1.2	.5	1.02	------	1.2	11.3	------	------	------
	Min	------	87.5	.2	.0	.2	------	.4	2.4	------	------	------
Cantaloupes	A. P.	[48] 53	43.6	.3	.1	.3	2.7	.3	2.5	------	13	60
Honeydew	A. P.	[49] 32	63.1	.4	.1	.4	4.0	.5	3.7	------	18	80
Spanish	A. P.	[50] 30	65.0	.4	.1	.4	4.1	.5	3.8	------	19	85
	No	------	*70*	*11*	*8*	*45*	------	*5*	*60*	------	------	------

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[3] Assumed.

[45] Some unimproved varieties are included; improved varieties contain relatively less refuse. Skins, 8 samples, av. 9.4 per cent; and seeds, 8 samples, av. 15.9 per cent.

[46] Predominating acid unknown.

[47] Many of the analyses of pulp included in this average are based on samples with low sugar and total solids as compared with the California cantaloupes, and Honeydew and Cassaba melons. Of these three types, 24 samples of pulp: Water, av. 90.7 per cent; max. 94.5 per cent; min. 87.5 per cent: Total sugars, av. 7.8 per cent; max. 11.3 per cent; min. 3.8 per cent. Percentages "as purchased" are calculated from the average of the edible portion of all varieties.

[48] Cantaloupe, rind and contents of cavity, 35 samples (Eden Gem and Early Waters), max. 71 per cent; min. 41 per cent; P. E. 3.9 per cent.

[49] Honeydew melon, rind and contents of cavity, 3 samples, max. 37 per cent; min. 26 per cent.

[50] Spanish melon, refuse, 2 samples, 37 and 23 per cent.

Composition of fresh fruits—Continued

		As purchased	Edible portion									
							Carbohydrates				Fuel value	
		Refuse	Water	Protein (N× 6.25)	Fat	Ash	Total by difference, including fiber	Fiber	Sugars as invert	Acid as malic (M), as citric (C)	Per 100 grams	Per pound
		P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
Muskmelon juice.[51]	Av.		87.2						9.1	0.18 C		
	P. E.		.7						.6			
	Max.		90.0						10.3			
	Min.		85.1						7.1			
	No.		*154*						*58*	*1*		
Nectarines (Amygdalus persica nectarina).	Av.	*Pits and skins* [52] 13	82.9	0.5	[3] 0.1	0.5	16.0	[53] 0.4	11.8	[46] 1.15 M	66.9	305
	Max.			.6					15.1	1.35		
	Min.			.4					9.6	.95		
	A. P.		72.1	.4	[3] .1	.4	14.0	.3	10.3	1.0	58	265
	No.		*1*	*3*	*0*	*1*		*1*	*8*	*2*		
Oranges (Citrus sinensis), all.	Av.	*Rinds and seeds* [54] 28	87.2	.9	.2	.47	11.2	.6	8.8	.68 C	50.2	230
	P.E.[55]	3.6	1.4	.2	.05	.06		.1	1.35	.13		
	Max.[55]	40	89.9	1.5	.3	.7		.8	11.8	1.00		
	Min.[55]	15	83.0	.6	.0	.35		.4	4.5	.39		
	A. P.		62.8	.6	.1	.3	8.2	.4	6.3	.5	36	165
	No.	*68*	*36*	*29*	*12*	*18*		*7*	*12*	*6*		
Orange juice: All	Av.								8.96	1.16 C		
	P. E.								.73	.17		
	Max.								14.3	1.79		
	Min.								5.04	.26		
	No.								*2,168*	*2,176*		
California-grown fruit.	Av.		85.7	.6	[3] 0.0	.58	13.1		9.14	1.23 C	54.8	250
	P. E.		1.2	.1		.04			.67	.15		
	Max.		90.2	.8		.7			14.3	1.79		
	Min.		81.9	.4		.49			6.52	.60		
	No.		*22*	*49*	*0*	*13*			*1,603*	*1,611*		
Florida-grown fruit.	Av.								8.43	.99 C		
	P. E.								.74	.18		
	Max.								12.56	1.61		
	Min.								5.04	.26		
	No.								*565*	*565*		

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[3] Assumed.

[46] Predominating acid unknown.

[51] Based entirely on California cantaloupe and Honeydew melon.

[52] Pits, 3 samples, av. 7.5 per cent; max. 8.7 per cent; min. 6.6 per cent. Skins, 2 samples, av. 5.5 per cent.

[53] Calculated from dried fruit.

[54] Refuse based almost wholly on California fruit. Rinds, 35 samples, av. 26.5 per cent; max. 36.1 per cent; min. 14.4 per cent; P. E. 3.6 per cent. Seeds, 15 samples, av. 1.2 per cent; max. 2.7 per cent; min. 0.1 per cent; P. E. 0.6 per cent.

[55] Approximate values, only 55 analyses for refuse, 23 for water, 16 for protein, and 148 for total sugars, were reported individually.

Composition of fresh fruits—Continued

		As purchased	Edible portion									
							Carbohydrates				Fuel value	
		Refuse	Water	Protein (N×6.25)	Fat	Ash	Total by difference, including fiber	Fiber	Sugars as invert	Acid as malic (M), as citric (C)	Per 100 grams	Per pound
		P. ct.										
		Rinds and seeds	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
Oranges, Mandarin type[57] (Citrus nobilis).	Av.	29	[58] 87.3	0.8	0.3	0.66	10.9	1.0	8.7	[59] 0.93 C	49.5	225
	A. P.		62.0	.6	.2	.5	7.7	.7	6.2	.7	35	160
	No.[60]	*23*	*24*	*23*	*22*	*21*		*1*	*23*	*62*		
Oranges, Mandarin type, juice.[57]	Av.		89.2	.9	.3	.4	9.2		7.8	.83 C	43.1	195
	P. E.		.9						.5	.08		
	Max.		91.2			.6			8.8	1.1		
	Min.		87.8			.3			6.0	.6		
	No.		*4*	*1*	*1*	*2*			*14*	*14*		
		Rinds and seeds										
Oranges, Seville, or Sour (Citrus aurantium).	Av.	41	87.0	.8	.2	.6	11.4		6.0	2.61 C	50.6	230
	P. E.		.2									
	Max.	41	87.4	1.0	.2				6.5	2.61		
	Min.	41	86.8	.6	.1				4.9	2.61		
	A. P.		51.3	.5	.1	.4	6.7		3.5	1.5	30	135
	No.	*2*	*4*	*3*	*2*	*1*			*3*	*2*		
		Rinds and seeds										
Papayas (Carica papaya).	Av.	[61] 32	88.7	.6	.1	.62	10.0	.9	9.0	.14 C	43.3	195
	P. E.	9.7	1.7	.1	.1	.10		.2	1.6	.03		
	Max.	60	94.0	1.1	.3	.94		2.0	15.2	.25		
	Min.	16	83.5	.4	.0	.37		.6	5.9	.08		
	A. P.		60.3	.4	.1	.4	6.8	.6	6.1	.1	30	135
	No.	*15*	*18*	*18*	*15*	*18*		*14*	*14*	*14*		
		Rinds and seeds										
Papaws, native (Asimina triloba).	Av.	[62] 25	76.6	5.2	.9	.5	16.8				96.1	435
	P. E.	1.5										
	Max.	30										
	Min.	23										
	A. P.		57.4	3.9	.7	.4	12.6				72	325
	No.	*10*	*1*	*1*	*1*	*1*						
		Pits and skins										
Peaches (Amygdalus persica): All	Av.	[63] 12	86.9	.5	[4] .1	.47	12.0	[4] .6	8.78	[64] .64 M	50.9	230
	P. E.[65]	2.0	1.2	.2	.03	.06		.1	.87	.11		
	Max.[65]	19	90.0	1.0	.1	.63		.6	13.07	1.5		
	Min.[65]	9	81.9	.2	.0	.32		.4	5.76	.35		
	A. P.		76.5	.4	.1	.4	10.6	.5	7.7	.6	45	205
	No.	*15*	*154*	*31*	*4*	*31*		*9*	*157*	*165*		

[4] Calculated in part from dried fruit.

[57] Including analyses of Mandarin, King, and Satsuma oranges and tangerines.

[58] Water in 5 individual samples, av. 85.5 per cent; max. 90.2 per cent; min. 80.0 per cent; P. E. 2.3 per cent.

[59] Satsuma oranges, 42 samples, reported individually, acid as citric, av. 0.96 per cent; max. 1.28 per cent; min. 0.66 per cent; and P. E. 0.11 per cent.

[60] Most of these figures not reported individually, 19 analyses reported only as averages. Rinds, 8 samples, av. 23.6 per cent; max. 26.0 per cent; min. 22.4 per cent; P. E. 0.8 per cent. Seeds, one sample, 4.1 per cent.

[61] Per cent of rind extremely variable. Seeds, 2 samples, av. 8.0 per cent.

[62] Skins, 10 samples, av. 7.3 per cent. Seeds, 10 samples, av. 17.9 per cent.

[63] Pits, 19 samples, av. 7.8 per cent. Skins, 13 samples, av. 5.1 per cent.

[64] Malic and citric acids present in almost equal proportion.

[65] Approximate values, only 146 analyses for water, 25 each for protein and ash, 7 for fiber, and 159 for acid were reported individually.

Composition of fresh fruits—Continued

		As purchased	Edible portion									
							Carbohydrates				Fuel value	
		Refuse	Water	Protein (N× 6.25)	Fat	Ash	Total by difference, including fiber	Fiber	Sugars as invert	Acid as malic (M), as citric (C)	Per 100 grams	Per pound
Peaches (Amygdalus persica)—Continued.		*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
Georgia-grown.	Av		85.8						9.4	[64] 0.65 M		
	P. E.		1.1						.8	.09		
	Max.		90.0						12.0	1.01		
	Min.		81.9						5.8	.46		
	No.		*30*						*30*	*30*		
North Carolina-grown.	Av		86.4						9.2	[64] .62 M		
	P. E.		.7						.7	.07		
	Max.		88.6						11.9	.83		
	Min.		83.9						7.7	.49		
	No.		*17*						*17*	*17*		
Maryland-grown.[69]	Av		87.1						8.6	[64] .62 M		
	P. E.		.8						.6	.10		
	Max.		89.1						10.4	.91		
	Min.		84.3						7.2	.37		
	No.		*27*						*27*	*27*		
New Jersey-grown.	Av		88.8						7.6	[64] .58 M		
	P. E.		.5						.6	.06		
	Max.		89.9						9.6	.74		
	Min.		86.8						6.1	.40		
	No.		*31*						*31*	*31*		
Peach juice	Av		86.5	0.2	[3] 0.0	0.5	12.8		11.8	[64] .56 M	52.0	235
	P. E.									.08		
	Max.					.5				.74		
	Min.					.4				.41		
	No.		*1*	*1*	*0*	*2*			*1*	*4*		
Pears (Pyrus communis):		*Skins and cores*										
All	Av	17	82.7	.7	.4	.39	15.8	[6] 1.4	[70] 8.9	[70] .29 C	69.6	315
	P. E.	3.2	1.7	.2	.1	.08			1.1	.07		
	Max.	27	86.1	1.2	.7	.7		1.8	14.7	.57		
	Min.	10	75.9	.2	.1	.3		.9	4.0	.10		
	A. P.		68.6	.6	.3	.3	13.2	1.2	7.4	.2	58	265
	No.	*12*	*94*	*13*	*7*	*9*		*3*	*91*	*92*		
Bartlett	Av		83.5	.4	[3] .4	.3	15.4		8.33	.32 C	66.8	305
	P. E.		.9	.1					.99	.07		
	Max.		85.8	.5		.3			11.82	.57		
	Min.		80.1	.2		.3			4.04	.10		
	No.		*58*	*4*	*0*	*2*			*62*	*63*		
Beurre Bosc	Av		81.0						10.1	.22 C		
	P. E.		2.2						1.1	.03		
	Max.		85.3						14.7	.32		
	Min.		75.9						7.7	.13		
	No.		*28*						*28*	*28*		

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[3] Assumed.

[6] Calculated from dried fruit.

[64] Malic and citric acids present in almost equal proportion.

[69] Including some samples grown in Virginia and West Virginia.

[70] Only one analysis other than Bartlett and Beurre Bosc varieties. Analyses of pear juices show differences in acid according to variety. Five samples of Bartlett pear juice average 0.31 per cent acid; five of Kieffer pear juice, 0.46 per cent acid; 38 of pear juices excluding Bartlett and Kieffer, 0.17 per cent acid. All were calculated as citric, though malic predominates in some varieties.

Composition of fresh fruits—Continued

		As purchased	Edible portion									
							Carbohydrates				Fuel value	
		Refuse	Water	Protein (N×6.25)	Fat	Ash	Total by difference, including fiber	Fiber	Sugars as invert	Acid as malic (M), as citric (C)	Per 100 grams	Per pound
Persimmons:		*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
Japanese, or Kaki (Diospyros kaki).	Av.	([73])	78.2	0.8	0.4	0.6	20.0	1.9	15.9	[46] 0.12 M	86.8	395
	P. E.	------	2.9	.2	.2	.1	------	.5	.8	.01	------	------
	Max.	------	86.0	1.6	.9	1.2	------	2.9	17.8	.16	------	------
	Min.	------	70.2	.4	.1	.4	------	.9	14.5	.10	------	------
	No.	*6*	*16*	*16*	*6*	*16*	------	*4*	*10*	*5*	------	------
Native (D. virginiana).	Av.	*Seeds and calyx* [74] 18	64.4	.8	.4	.9	33.5	1.5	18.9	[46].19 M	140.8	640
	P. E.	------	3.9	.1	.1	.1	------	.2	2.7	------	------	------
	Max.	------	72.2	1.2	.7	1.3	------	1.8	23.5	.26	------	------
	Min.	------	51.8	.5	.2	.6	------	1.0	14.3	.15	------	------
	A. P.	------	52.8	.7	.3	.7	27.5	1.2	15.5	.2	116	525
	No.	------	*14*	*10*	*7*	*10*	------	*7*	*5*	*8*	------	------
Pineapples (Ananas sativus).	Av.	*Crown core and parings* 39	85.3	.4	.2	.42	13.7	.4	11.9	.72 C	58.2	265
	P. E.	2.4	1.3	.1	------	.06	------	------	1.4	.13	------	------
	Max.	50	90.1	.6	.3	.7	------	------	15.3	1.10	------	------
	Min.	32	81.1	.2	.2	.3	------	------	8.2	.39	------	------
	A. P.	------	52.0	.2	.1	.3	8.4	.2	7.3	.4	35	160
	No.	*47*	*131*	*46*	*3*	*46*	------	*1*	*34*	*30*	------	------
Pineapple juice	Av.	------	86.2	------	------	------	------	------	11.8	1.02 C	------	------
	P. E.	------	1.0	------	------	------	------	------	1.3	.17	------	------
	Max.	------	89.4	------	------	------	------	------	15.9	2.75	------	------
	Min.	------	83.0	------	------	------	------	------	6.6	.69	------	------
	No.	------	*82*	------	------	------	------	------	*97*	*98*	------	------
Plantains, or Baking Bananas (Musa paradisiaca).	Av.	*Skins* 23	64.7	1.3	.4	.8	32.8	.4	25.3	[46].55 M	140.0	635
	Max.	24	67.8	1.4	.5	.9	------	.5	26.5	------	------	------
	Min.	22	61.6	1.2	.2	.8	------	.3	24.0	------	------	------
	A. P.	------	49.8	1.0	.3	.6	25.3	.3	19.5	.4	108	490
	No.	*2*	*2*	*2*	*2*	*2*	------	*2*	*2*	*1*	------	------
Plums, excluding prunes (Prunus spp.): **All**	Av.	*Pits and skins* [75] 15	85.7	.7	.2	.51	12.9	.5	8.3	1.60 M	56.2	255
	P. E.	------	2.1	.1	.1	.09	------	.1	1.2	.36	------	------
	Max.	------	90.6	1.2	.4	.80	------	1.0	14.9	2.56	------	------
	Min.	------	74.1	.4	.1	.3	------	.3	5.2	.52	------	------
	A. P.	------	72.8	.6	.2	.4	11.0	.4	7.1	1.4	48	220
	No.	*16*	*46*	*25*	*6*	*13*	------	*31*	*88*	*85*	------	------

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[46] Predominating acid unknown.

[73] Wide variation in per cent of seeds, some practically seedless, 3 samples gave an average of 3 per cent, and 3 others an average of 24 per cent.

[74] Total of averages of seeds and calyx. Seeds, 13 samples, av. 16.5 per cent; max. 22.9 per cent; min. 10.8 per cent; P. E. 2.1 per cent. Calyx, 4 samples, av. 1.6 per cent.

[75] From data on *Prunus domestica.* Pits, 14 samples, av. 4.6 per cent; max. 7.9 per cent; min. 2.4 per cent.

Composition of fresh fruits—Continued

		As purchased	Edible portion									
							Carbohydrates				Fuel value	
		Refuse	Water	Protein (N×6.25)	Fat	Ash	Total by difference, including fiber	Fiber	Sugars as invert	Acid as malic (M), as citric (C)	Per 100 grams	Per pound
		P. ct.										
Plums, excluding prunes (Prunus spp.): European type (P. domestica), excluding Damsons.		*Pits and skins*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
	Av	15	86.1	0.7	0.1	0.47	12.6	------	8.5	1.46 M	54.1	245
	P. E.	2.6	1.4	.2	------	.08	------	------	1.3	.43	------	------
	Max	23	88.9	1.2	------	.63	------	------	14.9	2.50	------	------
	Min	11	81.6	.4	------	.3	------	------	5.4	.52	------	------
	A. P.	------	73.2	.6	.1	.4	10.7	------	7.2	1.2	46	210
	No	*16*	*10*	*20*	*1*	*4*	------	------	*39*	*37*	------	------
Damson (P. domestica insititia).	Av	------	78.8	------	------	.67	------	0.4	8.7	2.02 M		
	P. E	------	1.9	------	------	.07	------	------	1.1	.22	------	------
	Max	------	81.7	------	------	.80	------	.5	11.2	2.40	------	------
	Min	------	74.1	------	------	.5	------	.3	6.6	1.61	------	------
	No	------	*4*	------	------	*4*	------	*2*	*4*	*4*	------	------
Japanese type (P. salicina).	Av	------	83.9	.7	.1	.4	14.9	------	7.98	[76] 1.69 M	------	------
	P. E	------	2.3	------	------	------	------	------	1.09	.26	------	------
	Max	------	89.7	------	------	------	------	------	11.52	2.56	------	------
	Min	------	80.5	------	------	------	------	------	5.20	.90	------	------
	No	------	*4*	*1*	*1*	*1*	------	------	*45*	*44*	------	------
Native American hybrids (Prunus spp.). Compass.	Av	------	87.6	[77] .5	[77] .3	[77] .42	11.2	.4	------	(78)	49.5	225
	P. E	------	1.2	------	------	------	------	.1	------	------	------	------
	Max	------	90.6	------	------	------	------	.6	------	------	------	------
	Min	------	86.1	------	------	------	------	.4	------	------	------	------
	No	------	*4*	*1*	*1*	*1*	------	*5*	------	------	------	------
Pomegranates (Punica granatum): Pulp with seeds.		*Skins*										
	Av	36	75.8	1.5	1.2	.6	20.9	3.6	11.9	.79 C	100.4	455
	P. E	3.4	------	------	------	------	------	------	------	------	------	------
	Max	44	78.3	1.6	2.0	.8	------	5.3	12.7	1.85	------	------
	Min	28	73.7	1.3	.5	.5	------	2.6	10.7	.16	------	------
	A. P.	------	48.5	1.0	.8	.4	13.3	2.3	7.6	.5	64	290
	No	*7*	*3*	*3*	*3*	*3*	------	*3*	*3*	*3*	------	------
Pulp without seeds.		*Skins and seeds*										
	Av	44	81.0	.6	.2	.5	17.7	.3	13.3	.62 C	75.0	340
	Max	53	84.2	.6	.3	.7	------	------	16.1	1.05	------	------
	Min	30	76.2	.5	.2	.3	------	------	10.1	.18	------	------
	A. P.	------	45.4	.3	.1	.3	9.9	.2	7.4	.3	42	190
	No	*3*	*3*	*2*	*2*	*3*	------	*1*	*3*	*2*	------	------
Prunes, fresh (Prunus domestica).		*Pits*										
	Av	[79] 6	76.5	.9	[8] .2	.6	21.8	[8] .5	13.3	.98 M	92.6	420
	P. E	1.1	4.6	.2	.1	.2	------	------	2.9	.37	------	------
	Max	11	89.3	1.7	.3	1.6	------	.6	24.1	2.14	------	------
	Min	2	61.6	.3	.0	.3	------	.4	5.5	.16	------	------
	A. P.	------	71.9	.8	.2	.6	20.5	.5	12.5	.9	87	395
	No	*86*	*50*	*72*	*4*	*48*	------	*2*	*89*	*55*	------	------

[8] Calculated from dried fruit.

[76] Juice of Japanese plums, 44 samples, av. 0.64 per cent; max. 1.70 per cent; min. 0.15 per cent.

[77] Calculated from water-free basis.

[78] Plum juice, American hybrids, 2 samples, acid as malic, av. 1.1 per cent; max. 1.3 per cent; min. 0.8 per cent.

[79] Skins are considered part of the edible portion. Skins, 5 samples, av. 10 per cent; max. 11 per cent; min. 5 per cent.

Composition of fresh fruits—Continued

		As purchased	Edible portion									
							Carbohydrates				Fuel value	
		Refuse	Water	Protein (N× 6.25)	Fat	Ash	Total by difference, including fiber	Fiber	Sugars as invert	Acid as malic (M), as citric (C)	Per 100 grams	Per pound
		P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
Quinces (Cydonia oblonga).	Av	------	85.3	0.3	0.1	0.38	13.9	1.8	6.3	0.87 M	57.7	260
	P. E	------	.6	------	------	.04	------	------	1.2	.11	------	------
	Max	------	86.9	------	------	.44	------	------	9.0	1.10	------	------
	Min	------	84.1	------	------	.28	------	------	4.2	.65	------	------
	No	------	*5*	*1*	*1*	*6*	------	*1*	*4*	*5*	------	------
Quince juice	Av	------	------	.3	------	.36	------	------	9.1	1.2 M	------	------
	Max	------	------	.3	------	.40	------	------	10.0	1.4	------	------
	Min	------	------	.2	------	.35	------	------	7.2	.8	------	------
	No	------	------	*2*	------	[30] *5*	------	------	[30] *5*	[30] *6*	------	------
Raspberries, black (Rubus spp.).	Av	------	80.7	1.5	1.6	.65	15.6	3.5	7.9	1.16 C	82.8	375
	P. E	------	2.3	.2	------	.09	------	------	.7	.30	------	------
	Max	------	86.4	2.1	1.7	.9	------	6.8	10.0	2.21	------	------
	Min	------	73.2	1.0	1.4	.4	------	.2	6.6	.67	------	------
	No	------	*15*	*18*	*2*	*13*	------	*2*	*11*	*17*	------	------
Raspberries, black, juice.	Av	------	88.4	.2	[3] 0.0	.7	10.7	------	7.6	1.04 C	43.6	200
	Max	------	88.8	.3	------	.7	------	------	7.8	1.05	------	------
	Min	------	88.0	.2	------	.6	------	------	7.3	1.02	------	------
	No	------	*2*	*2*	*0*	*2*	------	------	*2*	*2*	------	------
Raspberries, red (Rubus spp.).	Av	------	83.4	1.1	[3] .6	.47	14.4	2.8	7.18	1.34 C	67.4	305
	P. E.	------	1.4	.2	------	.05	------	1.3	1.25	.19	------	------
	Max	------	87.6	1.8	------	.60	------	4.6	9.96	2.21	------	------
	Min	------	78.9	.5	------	.34	------	.2	3.6	.88	------	------
	No	------	*32*	*21*	*0*	*35*	------	*6*	*38*	*42*	------	------
Raspberries, red, juice.	Av	------	90.8	.4	[3] 0.0	.46	8.3	------	7.3	1.40 C	34.8	160
	P. E	------	1.7	.04	------	.02	------	------	1.4	.16	------	------
	Max	------	93.1	.5	------	.5	------	------	10.3	1.65	------	------
	Min	------	86.8	.3	------	.42	------	------	5.1	.90	------	------
	No	------	*6*	*5*	*0*	*6*	------	------	*4*	*6*	------	------
Rhubarb (Rheum rhaponticum).	Av	*Leaves* 32	94.9	.5	.1	.72	3.8	[4] .7	.4	------	18.1	80
	P. E	------	.9	.1	.03	.13	------	.1	------	------	------	------
	Max	39	96.8	.8	.2	.97	------	.8	.5	------	------	------
	Min	18	92.6	.3	.1	.49	------	.4	.2	------	------	------
	A. P	------	64.5	.3	.1	.5	2.6	.5	.3	------	12	55
	No	*3*	*9*	*7*	*5*	*6*	------	*5*	*3*	------	------	------

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[3] Assumed.

[4] Calculated in part from dried fruit.

[30] Three analyses included in these numbers were reported only as an average.

Composition of fresh fruits—Continued

		As purchased	Edible portion									
							Carbohydrates				Fuel value	
		Refuse	Water	Protein (N×6.25)	Fat	Ash	Total by difference, including fiber	Fiber	Sugars as invert	Acid as malic (M), as citric (C)	Per 100 grams	Per pound
		P. ct.										
		Stems and caps	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Cals.*	*Cals.*
Strawberries (Fragaria spp.).	Av.	4	90.0	0.8	0.6	0.50	8.1	1.2	5.27	1.09 C	41.0	185
	P. E.	1.1	1.3	.1	.1	.08	------	.4	1.04	.20	------	------
	Max.	8	94.0	1.4	1.1	.9	------	2.3	10.00	1.81	------	------
	Min.	1	84.2	.4	.3	.2	------	.2	2.59	.13	------	------
	A. P.	------	86.4	.8	.6	.5	7.7	1.2	5.1	1.0	39	175
	No.	*32*	*107*	*92*	*23*	*113*	------	*30*	*103*	*140*	------	------
Strawberry juice.	Av.	------	94.2	.2	[3] 0.0	.45	5.1	------	3.63	1.01 C	21.2	95
	P. E.	------	.3	.1	------	.05	------	------	.30	.09	------	------
	Max.	------	94.7	.4	------	.55	------	------	4.46	1.20	------	------
	Min.	------	93.0	.1	------	.30	------	------	2.99	.78	------	------
	No.	------	*9*	*7*	*0*	*10*	------	------	*9*	*10*	------	------
Tangerines (See oranges, Mandarin type).												
		Rinds and seeds										
Watermelons (Citrullus vulgaris).	Av.	54	92.1	.5	.2	.27	6.9	.6	6.0	.03 M	31.4	140
	P. E.	5.6	.3	.1	.04	.03	------	------	------	------	------	------
	Max.	62	92.9	.9	.2	.31	------	1.0	7.0	------	------	------
	Min.	40	91.3	.3	.1	.2	------	.2	5.0	------	------	------
	A. P.	------	42.4	.2	.1	.1	3.2	.3	2.8	.01	14	65
	No.	*5*	*6*	*6*	*5*	*6*	------	*3*	*2*	*1*	------	------

[3] Assumed.

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